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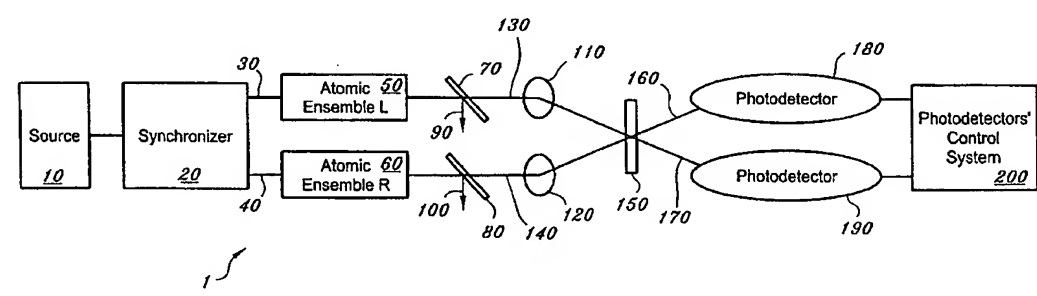
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(54) Title: LONG-DISTANCE QUANTUM COMMUNICATION



(57) Abstract: The invention provides systems and methods enabling high fidelity quantum communication over long communication channels even in the presence of significant loss in the channels comprising laser manipulation of quantum correlated atomic ensembles using linear optic components (110, 120), optical sources of low intensity pulses (10), beam splitters (150), single-photon detectors (180, 190) requiring only moderate efficiencies. The invention provides fault-tolerant entanglement generation, connection, using a sequence of steps that each provide built-in entanglement purification and are each resilient to the realistic noise. The invention relies upon collective rather single particle excitations in atomic ensembles and result in communication efficiency scaling polynomially with the total length of a communication channel.

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INTERNATIONAL SEARCH REPORT

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A. CLASSIFICATION OF SUBJECT MATTER

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B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 359/112

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
USPTO, US-PG PUBS, IBMTDB, EPO, JPO, DERWENT**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 5,339,182 A (Kimble et al.) 16 August 1994 (16.08.1994), see entire document.	1-56
Y	US 5,418,905 A (Rarity et al.) 23 May 1995 (23.05.1995), see entire document.	1-56
Y	US 5,243,649 A (Franson) 07 September 1993 (07.09.1993), see entire document.	1-56

☐ Further documents are listed in the continuation of Box C.☐ See patent family annex.

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"O" document referring to an oral disclosure, use, exhibition or other means	"&" document member of the same patent family
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